

【Description】**【Invention Title】**

A DOUBLE-COVERED LYCRA SOFT YARN

【Technical Field】

This invention relates to the yarn for knitting socks, especially, the polyurethane based Lycra Soft 520 denier for the prevention of twist and maintenance of elasticity after processing.

By double covering the polyurethane based Lycra Soft 520 denier yarn with nylon 70D/24F/1 high speed textured, applying S twist and Z twist at the same time to prevent twisting, maintain the elongation rate of the Lycra Soft 520 denier yarn at proper value while utilizing the maximum restitution.

When the said nylon 70D/24F/1 high speed textured yarn(20, 30) is wound first in S twist(842.8TPM) and second in Z twist(1960.8TPM), the Lycra Soft 520 denier yarn, which is the core yarn, gives the elongation rate(tensile elongation 440.9%, permanent elongation 7.2%, restitution rate 98.2%) which is lower than the original value.

【Background Art】

To produce polyurethane based Lycra Soft 520 denier yarn double covered with nylon.

【Disclosure】**【Technical Problem】**

Generally speaking, core yarn used for producing socks has been used with special yarn feeding devices which incorporate anti-slip device for polyurethane yarn, without any specific processing, due to the high elasticity.

The socks produced in this method present the characteristics of the Lycra Soft 520 denier yarn which has a stronger restitution and elongation than common yarn.

However, sometimes it is necessary for the socks made with Lycra Soft 520 denier yarn to be restricted in its elongation rate, especially for leisure - sports activity socks, which has not been possible in conventional ways.

In addition, due to the structural characteristics of the elastic thread feeding device of common sock knitting machines, it is difficult to design knitting with Lycra Soft yarn which is liable to slip at feeding.

The technical goal of this invention is to produce polyurethane based Lycra Soft yarn double covered with nylon, for the prevention of twisting and maintenance of elasticity after processing.

【Technical Solution】

In this invention, it is possible to replace the said nylon high speed textured yarn with any one of polyamide, polyester, or polypropylene fiber which are filament yarn or long staple, or with a long staple copolymer yarn.

As described hereinabove, by double covering the polyurethane based Lycra Soft 520 denier yarn with nylon 70D/24F/1 high speed textured, applying S twist and Z twist at the same time to prevent twisting, maintain the elongation rate of the Lycra Soft 520 denier yarn at proper value while utilizing the maximum restitution.

When the said nylon 70D/24F/1 high speed textured yarn(20, 30) is wound first in S twist(842.8TPM) and second in Z twist(1960.8TPM), the Lycra Soft 520 denier yarn, which is the core yarn, gives the elongation rate(tensile elongation 440.9%, permanent elongation 7.2%, restitution rate 98.2%) which is lower than the original value.

In order to accomplish the strength of sock parts in accordance with the shape of leg using Lycra Soft 520 denier yarn, processed by this invention, the feeding speed of the yarn into knitting machine with the double covered yarn roller, which is provided in most machines, and the stepping motor.

Finished socks, as well as similar products, are heat treated(approximately for 40-50 minutes at 90-100℃) after dyeing in order to give high elasticity to the Lycra Soft 520 denier yarn double covered in accordance with this invention, and to strengthen the compression property of the product by contracting the nylon 70D/24F/1 high speed textured yarn.

In addition, the surface of the nylon 70D/24F/1 high speed textured yarn covering the Lycra Soft 520 denier yarn becomes smoother by the heat contraction, giving better wearing sense and the structural stability of the product, providing the elasticity and compression better than a compress.

As for the knitting method, the core yarn produced by the art of this invention is not only used in a specific part of socks but used in all the part of socks except the toe and heel. The partial compression according to the shape of leg is controlled with the double covered yarn roller and the stepping motor which are installed at most sock knitting machines.

By implementing high elastic multi-stage compressive knitting technology, blood in foot is pressed upward promoting circulation as well as protection of ankles, preventing and absorbing sweat, and enhancing durability.

The fruit of this invention can be maximized by incorporating proper management of production processes including knitting and after process treatments.

【Advantageous Effects】

By this invention, the Lycra Soft yarn double covered with nylon high speed textured yarn can be protected from twisting and maintain high elasticity, therefore, the socks knitted with said yarn provide the elasticity better than a compress, soft restitution, soft wearing sense, and comfort.

【Description of Drawings】

Figure 1 illustrates the Lycra Soft 520 denier yarn double covered by the art of this invention.

<Numbers and Symbols of the Drawings>

10....Lycra Soft Yarn 20,30....Nylon 70D/24F/1 High Speed Textured Yarn

【Best Mode】

The most desirable shape of the embodiment of this invention is the Lycra Soft 520 denier yarn, covered first by S twist and second by Z twist with nylon 70D/24F/1 high speed textured yarn.

【Mode for Invention】

The double covered Lycra Soft yarn of this invention is characterized by the polyurethane based Lycra Soft 520 denier yarn double covered with nylon high speed textured yarn, to prevent twisting and maintain elasticity after processing.

And, the said nylon high speed textured yarn is characterized by nylon 70D/24F/1 high speed textured yarn.

And, the said nylon high speed textured is characterized by being replaced with any one of filament yarn, polyamide yarn, polyester yarn, or polypropylene yarn.

And, the said double covering is characterized by first and second covering by S twist.

And, the said double covering is characterized by S twist first and then Z twist second.

And, the said double covering is characterized by Z twist first and then S twist second.

And, the said double covering is characterized by first and second covering by Z twist.

Herein below, the invention is described in detail referring to the drawings:

Figure 1 illustrates an embodiment of a core yarn double covered with nylon, comprising the core yarn(10) and nylon high speed textured yarn(20, 30).

A core yarn(10) is the material of fabric, which is the polyurethane based Lycra Soft 520 denier yarn in this invention.

Nylon high speed textured yarn(20, 30) has superior elasticity and contraction by heat treatment, which is the nylon 70D/24F/1 high speed textured yarn in this invention.

Figure 1 illustrates the Lycra Soft 520 denier yarn(10) double covered with nylon 70D/24F/1 high speed textured yarn(20, 30) by S twist or Z twist, to prevent twisting and to maintain elasticity after processing.

The said double covering may be carried out in such a manner that S twist covering first then Z twist covering next, or in reverse.

Or, said double covering may be comprised of S twist or Z twist only for both first and second covering.

In this invention, the said nylon high speed textured yarn may be replaced with filament yarn, or any one of polyamide, polyester, polypropylene which is long staple, or with long staple copolymer yarn.

As described hereinabove, by double covering the polyurethane based Lycra Soft 520 denier yarn with nylon 70D/24F/1 high speed textured yarn(20, 30), applying S twist and Z twist at the same time to prevent twisting, maintain the elongation rate of the Lycra Soft 520 denier yarn at proper value while utilizing the maximum restitution.

When the said nylon 70D/24F/1 high speed textured yarn(20, 30) is wound first in S twist(842.8TPM) and second in Z twist(1960.8TPM), the Lycra Soft 520 denier yarn, which is the core yarn, gives the elongation rate(tensile elongation 440.9%, permanent elongation 7.2%, restitution rate 98.2%) which is lower than the original value.

In order to accomplish the strength of sock parts in accordance with the shape of leg using Lycra Soft 520 denier yarn, processed by this invention, the feeding speed of the yarn into knitting machine with the double covered yarn roller, which is provided in most machines, and the stepping motor.

Finished socks, as well as similar products, are heat treated(approximately for 40-50 minutes at 90-100℃) after dyeing in order to give high elasticity to the Lycra Soft 520 denier yarn double covered in accordance with this invention, and to strengthen the compression property of the product by contracting the nylon 70D/24F/1 high speed textured yarn.

In addition, the surface of the nylon 70D/24F/1 high speed textured yarn covering the Lycra Soft 520 denier yarn becomes smoother by the heat contraction, giving better wearing sense and the structural stability of the product, providing the elasticity and compression better than a compress.

As for the knitting method, the core yarn produced by the art of this invention is not only used in a specific part of socks but used in all the part of socks except the toe and heel. The partial compression according to the shape of leg is controlled with the double covered yarn roller and the stepping motor which are installed at most sock knitting machines. By implementing high elastic multi-stage compressive knitting technology, blood in foot is pressed upward promoting circulation as well as protection of ankles, preventing and absorbing sweat, and enhancing durability.

As set forth hereinabove, this invention has been described referring to the embodiments illustrated in the drawings, however, such descriptions are only exemplary and explanatory, and it is obvious that anyone who has common knowledge in the field of art of this invention will be able to modify, change, or add in a wide variety not departing from the spirit and the scope of this invention as set forth in the appended claims, therefore, such modifications, changes, or additions should be considered to be covered by and included in the claims of this invention.

【Industrial Applicability】

In order to accomplish the strength of sock parts in accordance with the shape of leg using Lycra Soft 520 denier yarn, processed by this invention, the feeding speed of the yarn into knitting machine with the double covered yarn roller, which is provided in most machines, and the stepping motor.

Finished socks, as well as similar products, are heat treated (approximately for 40-50 minutes at 90-100°C) after dyeing in order to give high elasticity to the Lycra Soft 520 denier yarn double covered in accordance with this invention, and to strengthen the compression property of the product by contracting the nylon 70D/24F/1 high speed textured yarn.

In addition, the surface of the nylon 70D/24F/1 high speed textured yarn covering the Lycra Soft 520 denier yarn becomes smoother by the heat contraction, giving better wearing sense and the structural stability of the product, providing the elasticity and compression better than a compress.

As for the knitting method, the core yarn produced by the art of this invention is not only used in a specific part of socks but used in all the part of socks except the toe and heel. The partial compression according to the shape of leg is controlled with the double covered yarn roller and the stepping motor which are installed at most sock knitting machines. By implementing high elastic multi-stage compressive knitting technology, blood in foot is pressed upward promoting circulation as well as protection of ankles, preventing and absorbing sweat, and enhancing durability.

【CLAIMS】**【Claim 1】**

The lycra soft yarn, wherein the said lycra soft yarn is a polyurethane based Lycra Soft 520 depier yarn double covered with nylon high speed textured yarn in order to prevent twisting and to maintain elasticity after processing.

【Claim 2】

The Lycra Soft yarn double covered with nylon yarn of claim 1, wherein the said nylon yarn is nylon 70D/24F/1 high speed textured yarn.

【Claim 3】

The Lycra Soft yarn double covered with nylon yarn of claim 1, wherein the said nylon high speed textured yarn can be replaced with any one among the filament yarn, polyamide yarn, polyester yarn, or polypropylene yarn.

【Claim 4】

The double covered Lycra Soft yarn of claim 1, wherein the double covering is carried out by S twist for the first and the second covering.

【Claim 5】

The double covered Lycra Soft yarn of claim 1, wherein the double covering is carried out by S twist for the first covering and by Z twist by the second covering.

【Claim 6】

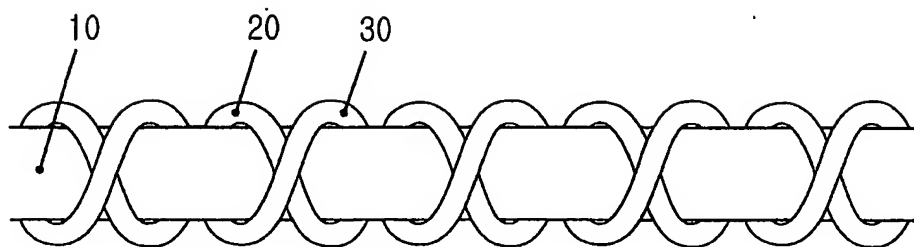
The double covered Lycra Soft yarn of claim 1, wherein the double covering is carried out by Z twist for the first covering and by S twist by the second covering.

【Claim 7】

The double covered Lycra Soft yarn of claim 1, wherein the double covering is carried out by Z twist for the first and the second covering.

【DRAWINGS】

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【Figure 1】

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2004/003537

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 D02G 3/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 D02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR : IPC as above

JP (utility models) : IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 2000-70540 A (DU PONT-TORAY CO., LTD) 25 NOVEMBER 2000 See the whole document	1-7
X	JP 5-163626 A (ASAHI CHEM IND CO., LTD) 29 JUNE 1993 See the whole document	1-3, 5, 6
X	JP 2003-119636 A (DU PONT-TORAY CO., LTD) 23 APRIL 2003 See the whole document	1-4, 7
X	JP 9-67702 A (TOYOBO CO., LTD) 11 MARCH 1997 See the whole document	1-4, 7
X	JP 7-238429 A (TOYOBO CO., LTD) 12 SEPTEMBER 1995 See the whole document	1-4, 7



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

24 MAY 2005 (24.05.2005)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

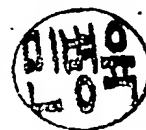
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2004/003537

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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